

**What Is Claimed Is:**

1 1. A system for providing high frequency data  
2 communications in a satellite-based communications network, the system  
3 comprising:

4 a plurality of communications satellites each having uplink and  
5 downlink antennas capable of receiving and transmitting a plurality of signals,  
6 each of said satellites having a communication control circuit;

7 at least one of said satellites being a reconfigurable satellite having,

8 a programmable frequency synthesizer coupled to a  
9 communications control circuit;

10 a controller located on said satellite coupled to said  
11 communications control circuit, said controller controlling a frequency  
12 reconfiguration of said communications control circuit through said  
13 programmable frequency synthesizer.

1 2. A system as recited in claim 1 wherein each of said satellites  
2 further comprising a beam forming network coupled to said uplink and downlink  
3 antennas.

1 3. A system as recited in claim 1 wherein said communications  
2 control circuit comprises an up converter and a down converter.

1 4. A system as recited in claim 1 wherein said communications  
2 control circuit comprises a transponder.

1 5. A system as recited in claim 4 wherein said transponder comprises  
2 an up converter and a down converter.

1 6. A system as recited in claim 1 wherein said communications  
2 control circuit comprises a time division multiple access switch.

1 7. A system as recited in claim 1 wherein said communications  
2 control circuit comprises a packet switch.

1 8. A system as recited in claim 1 wherein said plurality of  
2 communications satellites have an orbit selected from the group consisting of a  
3 LEO, MEO and GSO.

1 9. A payload circuit for a satellite comprising:  
2 a receive array;  
3 a receive beam forming network;  
4 a transmit array;  
5 a transmit beam forming network;  
6 a communications control circuit for controlling communications  
7 of satellite; and  
8 a reconfiguration circuit coupled to the communications control  
9 circuit for reconfiguring the communications control circuit.

1 10. A payload circuit as recited in claim 9 wherein said  
2 communications control circuit comprises an up converter and a down converter.

1 11. A payload circuit as recited in claim 9 wherein said  
2 communications control circuit comprises a transponder.

1 <sup>11</sup>12. A payload circuit as recited in claim <sup>10</sup>11 wherein said transponder  
2 comprises an up converter and a down converter.

1 13. A payload circuit as recited in claim 9 wherein said  
2 reconfiguration circuit comprises a programmable frequency synthesizer coupled  
3 to said up converter and said down converter.

1 14. A payload circuit as recited in claim 9 wherein said  
2 reconfiguration circuit comprises an on-board computer.

1 15. A payload circuit as recited in claim 14 wherein said  
2 reconfiguration circuit comprises a routing table, said on-board computer  
3 updating said routing table with reconfiguration data.

1 16. A payload circuit as recited in claim 9 wherein said  
2 communications control circuit comprises a time division multiple access switch.

1 17. A payload circuit as recited in claim 9 wherein said  
2 communications control circuit comprises a packet switch.

1 <sup>INNOV</sup> 18. A method of configuring a satellite system having a plurality of  
2 satellites comprising the steps of:

3 deploying a reconfigurable satellite;

4 transmitting reconfiguration instructions to said satellite;

5 reconfiguring the payload of the reconfigurable satellite;

6 repositioning a satellite from a network position; and

7 moving the reconfigurable satellite into the network position.

1 19. A method as recited in claim 18 wherein the step of reconfiguring  
2 a satellite comprises the step of changing the up converter frequency and down  
3 converter frequency.

1 <sup>18</sup> 20. A method as recited in claim <sup>17</sup> 19 wherein the step changing the up  
2 converter frequency and down converter frequency comprises the step of  
3 changing a frequency in a programmable frequency synthesizer.

1 <sup>19</sup> 21. A method as recited in claim <sup>16</sup> 18 wherein the step of reconfiguring  
2 a satellite comprises changing the amplitude or phase coefficients of a transmit  
3 and receive beam.

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